NASA System-Wide Safety and **In-Time Aviation Safety** Management **Systems** (IASMS)



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Evolution of Airspace Operations and Safety



Evolution of Airspace Operations and Safety

S-curves

Safety



Procedural
Estimate the current
and planned a/c
positions

rent

Human-centered safety monitoring, assessment and mitigation

+Density



Radar
Know the current and estimate
planned a/c positions

+ Efficiency and proactive planning



Trajectory
Know & exchange
current and planned a/c
positions

+ Service oriented architecture for tailored mission oriented services



Collaborative
Connected,
performance-based,
collaborative ATM

Introduces 3rd-party service providers

+ Complexity, scalability, and dynamic adaptation



Highly-Automated
ML/Al – based dynamic, robust
performance and safety

Machine-to-machine interactions and humans collaborate

Digital Transformation of ATM

Automated in-time safety monitoring and alerting services Integrated predictive risk mitigation across domains

Automatically-assured adaptive in-time safety threat management

Epoch 1

Epoch 2

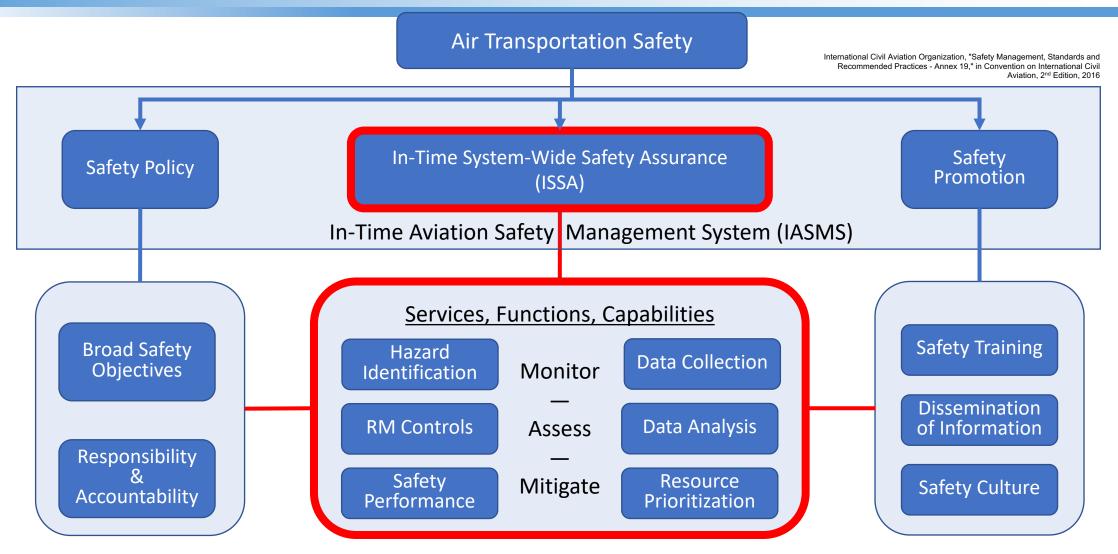
Epoch 3

Epoch 4 (~2035) Epoch 5 (~2045)



How We Achieve Aviation Safety Tomorrow

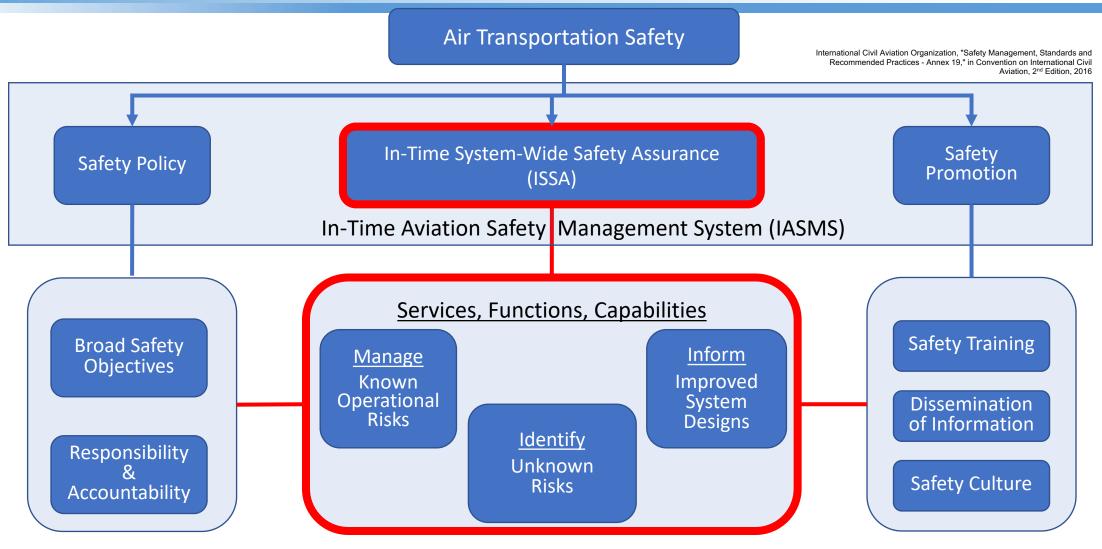




Services, Functions, and Capabilities Execute Risk Management and Safety Assurance Actions

How We Achieve Aviation Safety Tomorrow





Quickly manage known operational risks at scale

Quickly identify unknown risks

Quickly inform design

Services, Functions & Capabilities (SFCs)

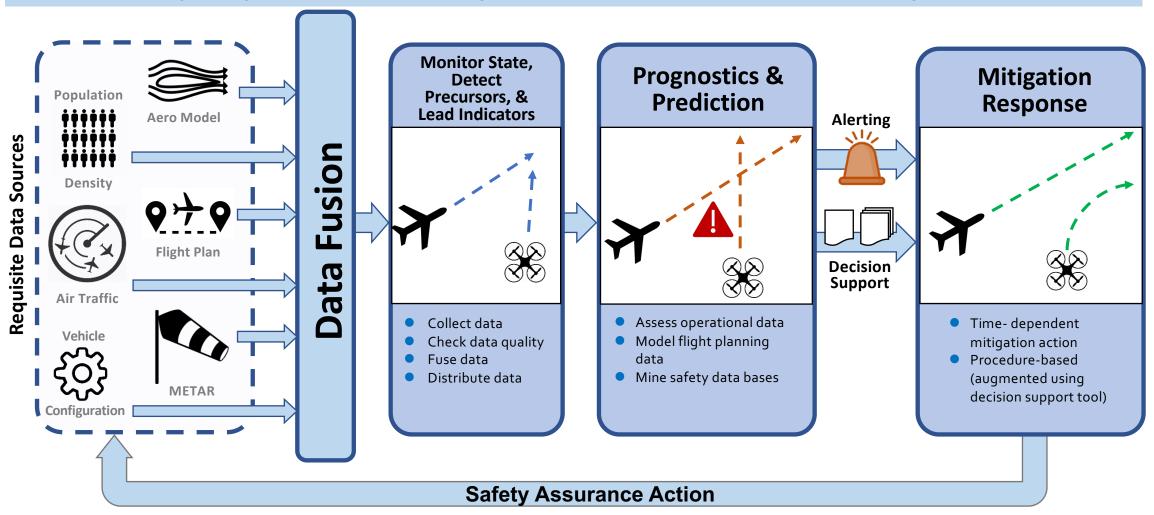


Monitor

Assess

Mitigate

National Airspace System → Data → NAS System State → Elevated Risk State → Safety Assurance Action

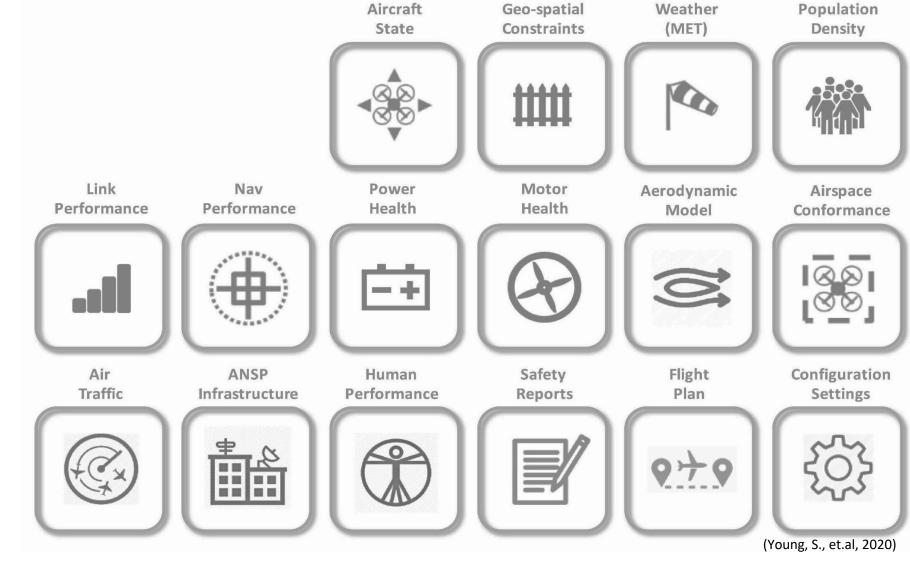


It All Starts with Data...



Information classes useful to enable IASMS SFCs

- ANSP Sourced
- Operator Sourced
- Vehicle Sourced
- Supplemental Data
 Service Provider (SDSP)
 Sourced
- System Wide Information Management (SWIM) / Flight Information Management System (FIMS) Sourced



> Other Sources...

Service Oriented Architecture





Data

£

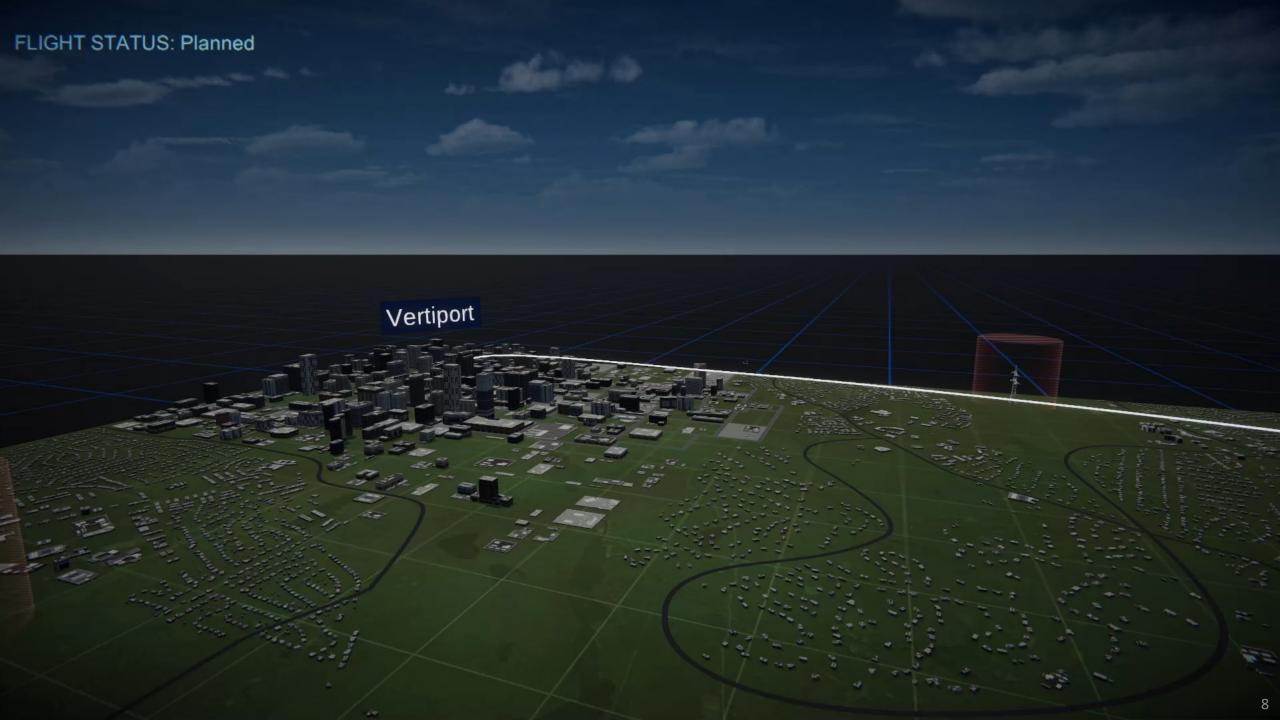
Human Performance

ANSP Population Configuration Safety Infrastructure Density Settings Reports

SFCs

Monitor data, make assessments, and perform or inform a safety assurance action

Interconnected ISSA SFCs that provide In-Time Risk Management and Safety Assurance



Complexities, Risks and Constraints

